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Science at Sea: Meeting Future Oceanographic Goals with a Robust Academic Research Fleet

Briefing for the 2009 UNOLS Annual Meeting

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Committee on Evolution of the National
Oceanographic Research Fleet

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Outline

- Background and context
- Committee charge
- Findings
- Recommendations

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Background

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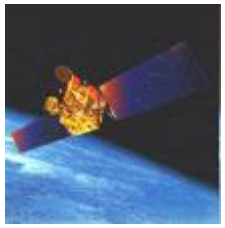
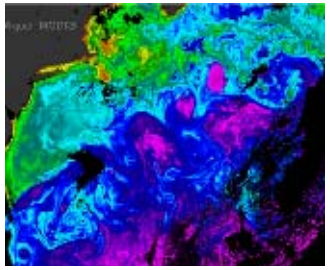
What types of missions might occur in the future?

How might the role of ships change?



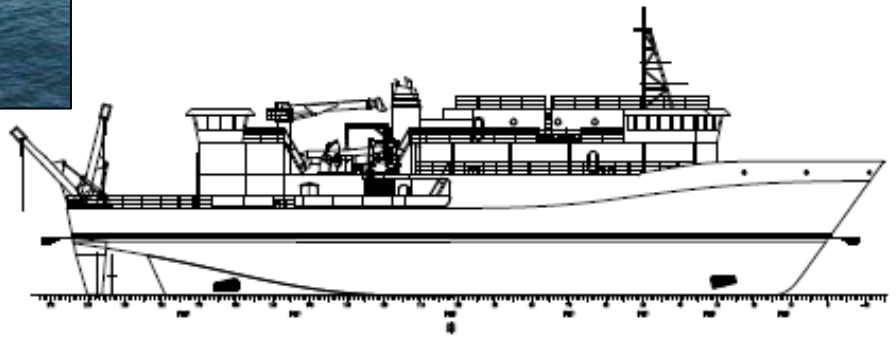


How will costs impact the future fleet?

What equipment will be needed?

Background

When study began, Navy was preparing an RFP for the design of 2 new Ocean Class ships



Statement of Task

In support of the need for oceanographic fleet replacement, the Office of Naval Research (ONR) is currently in the early design process for the first of two new Ocean Class ships and requires near-term advice on how the rapid advancements in ocean observing technology and the impacts of rising costs will impact the future fleet relative to Navy needs. Therefore, ONR has requested that the National Research Council (NRC) appoint an ad hoc committee **to review the scientific and technological issues that may affect the evolution of the University National Oceanographic Laboratory System (UNOLS) academic fleet, including**:

1. How technological advances such as autonomous underwater vehicles and ocean observing systems will affect the role and characteristics of the future UNOLS fleet with regard to accomplishing national oceanographic data collection objectives.

2. The most important factors in oceanographic research vessel design. Do specialized research needs dominate the design criteria and, if so, what are the impacts on costs and overall availability?

Statement of Task (cont.)

3. How evolving modeling and remote sensing technologies will impact the balance between various research operations such as ground-truthing, hypothesis testing, exploration, and observation.

4. How the increasing cost of ship time will affect the types of science done aboard ships.

5. The usefulness of partnering mechanisms such as UNOLS to support national oceanographic research objectives.

Findings

Findings (1)

- The U.S. academic research fleet provides an essential, enabling resource for the nation.

Findings (2)

- Scientific demands on the U.S. academic fleet are likely to increase in future years. However, aging ships and evolving technology require fleet modernization and recapitalization to maintain the nation's leadership in ocean research.

Findings (3)

- The fleet of the future will be required to support increasingly complex, multidisciplinary, multi-investigator research projects, including those in support of autonomous technologies, ocean observing systems, process studies, remote sensing, and modeling.

Findings (4)

- Ocean observatories and autonomous vehicles will impact future vessel design requirements for acoustic communications, deck space, payload, berthing, launch and recovery, and stability. Servicing ocean observatories and launching and recovering autonomous vehicles will result in increased demands for ship time.

Findings (5)

- There is a need for increased ship-to-shore bandwidth, in order to facilitate real-time, shore-based modeling and data analysis in support of underway programs, allow more participation of shore-based scientists, and increase opportunities for outreach.

Findings (6)

- Supporting future research needs will require both highly adaptable general purpose ships and specialized vessels. Some vessels should be capable of operating in high latitudes and high sea states. More capable Coastal, Regional, and Global class ships will also be needed.

Findings (7)

- Development of the NSF-sponsored ARRV has benefited from community-driven ship design, allowing the users to participate more fully and create optimal designs within cost constraints.

Findings (8)

- The increasing cost of ship time and economies of scale associated with larger ships may lead to greater usage of the Global class vessels, which have laboratories, deck space, and berthing capabilities that can support multiple science operations.

Findings (9)

- The UNOLS consortium management structure is sound and is of benefit to research institutions, federal agencies, state and private interests. The federal agency partnerships that capitalize and support the academic research fleet, particularly between the Navy and NSF, have a proven record of cost savings and asset sharing. However, there are many assets that are not integrated with UNOLS, leading to sub-optimal use of the full U.S. research fleet.

Recommendations

Fleet Renewal Plan

Recommendation

Federal agencies supporting oceanographic research should implement **one comprehensive, long-term research fleet renewal plan** to retain access to the sea and maintain the nation's leadership in addressing scientific and societal needs.

Community Involvement

Recommendation

All future UNOLS ship acquisitions, beginning with the planned Ocean Class vessels, should **involve the scientific user community** from the preconstruction phase through post delivery of the ship.

Larger, Capable Ships

Recommendation

The future academic research fleet requires investment in **larger, more capable, general purpose Global and Regional** class ships to support multidisciplinary, multi-investigator research and advances in ocean technology.

Integration with NOAA

Recommendation

NOAA should identify which of its 13,200* unmet annual ship day needs could be supported by the UNOLS fleet. **NOAA and UNOLS should work together** to develop a long-term plan to increase the usage of UNOLS ships in support of the NOAA mission.

*As identified by the NOAA Office of Marine and Aviation Operations in their 2008 Ship Recapitalization Plan

Integration w/OPP and USCG

Recommendation

The NSF Division of Ocean Sciences, NSF Office of Polar Programs, and the U.S. Coast Guard should **improve coordination** of ship operations and support between the UNOLS and polar research fleets.

Final Report

The final report will be available December 2009.

Prepublication copies can be downloaded from www.nap.edu.

Thank you